HWY 567 / Pipe Creek Road

Libby North

Corridor Study

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Libby North Corridor Planning Study

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Volume I

Montana Department of Transportation

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Executive Summary

Highway (Hwy) 567 is located in northwest Montana and runs between the City of Libby and the community of Yaak. The 14-mile section of Hwy 567 that is included in this study is from Reference Post (RP) 6.1 near the Bobtail Cutoff Road to RP 20.1 near the Turner Mountain Road (see Figure 1). Hwy 567 is located in the Kootenai National Forest (designated as Forest Highway 67) and in the Cabinet-Yaak Mountains. The road provides access to Forest Service lands for skiing, hunting, camping, and hiking activities. The road has historically been used for logging and that use continues today.

In July 2006, the Montana Department of Transportation hired the consulting firm PB Americas, (formerly named Parsons Brinckerhoff, Quade and Douglas) to complete this corridor study for Hwy 567, located in northwest Montana, from RP 6.1 to RP 20.1. Lincoln County Commissioners, the United States Forest Service (USFS), and Federal Highway Administration (FHWA) are partners in this study process.

This document discusses the findings and recommendations for the Libby North Corridor Study conducted by PB Americas (PB) for Montana Department of Transportation (MDT) between July 2006 and June 2007. The purpose of this study is to develop a comprehensive, long-range plan for managing and improving the Hwy 567 corridor (locally known as Pipe Creek Road). The existing corridor geometrics are challenging in terms of both vertical and horizontal alignments through a mountainous terrain and abutting Pipe Creek at various points along the route. In addition, the corridor lies just outside the designated Cabinet-Yaak Grizzly Bear Recovery Zone, but within a grizzly bear habitat distribution area. Consequently, the corridor study evaluates the feasibility of improving the corridor including assessing a range of low-level safety type improvements through major reconstruction.

The corridor study process evaluated existing and future conditions of the corridor and made recommendations for improving Hwy 567 within the study limits. Activities included:

- researching existing conditions;
- documenting existing and projected environmental, geotechnical and land use conditions;
- forecasting future growth;
- identifying corridor issues;
- identifying goals and analyzing improvement options for the corridor from several perspectives including constructability, financial feasibility, and public acceptance; and
- recommending improvements and management strategies for the existing and long-term safety and operation of the corridor.

The process involved a collaborative effort with local jurisdictions, other agencies and the public in identifying transportation problems and the most efficient and effective solutions to them. The process provides a means for facilitating resolution of major issues before specific project programming and development begin.

Study Objectives and Corridor Needs

Objectives for the study were identified at the beginning of the study process and were refined as needed during the course of the study.

Objectives of the study included the following:

- Document existing conditions –roadway & environmental
- Project future growth
- Identify corridor issues
- Develop corridor goals and possible improvement options
- Analyze future transportation improvements based on impacts, constructability, public acceptance, & financial feasibility

- Recommend improvement options and management strategies for long-term safety and operation of the corridor

The needs and additional objectives for the corridor identified during the study process are:

- Improve safety conditions and decrease accidents
  - Improve geometric elements
  - Address inconsistent roadway widths
  - Improve winter driving and maintenance conditions

- Minimize impacts to the threatened and endangered species
  - Maintain existing wildlife linkage zones

- Maintain character of corridor (mountain roadway)
  - Balance the needs of all users (residents, emergency responders, logging, truckers, recreational)
  - Provide a roadway that is an asset to Libby and Yaak

Strategies for Identifying Corridor Problems

The following strategies were utilized to identify problems within the study corridor:

A. Review of existing MDT reports – Existing reports that MDT has prepared for the corridor were reviewed and include the following:

   - Preliminary Field Report dated January 21, 2003
   - MDT Accident Analysis Reports generated for the corridor from January 1, 1995 through March 31, 2006

   The analysis showed that accident trends within the corridor are higher than the statewide average for similar type routes. Also the overall trend is loss of control on curves, usually during snowy, slushy or icy roadway conditions. More than half of the accidents that occurred within the corridor occurred at night.

B. Stakeholder interviews – A list of stakeholders to be interviewed was developed by MDT, Lincoln County, and the Forest Service. From this list, 13 project stakeholders were interviewed. During the stakeholder interviews safety and environmental concerns were discussed with resource agency staff, business owners, non-profit organizations and a local government official.

   Those who were interviewed were:

Name	**Affiliation**
Bruce Zwang	Turner Mountain Resort
Bill Patten	St. John's Lutheran Hospital
Jay Ramlo	Property Owner
Ron Higgins	Lincoln County School Superintendent
Jerry Wolcot	Plum Creek Timberland, Inc.
Scott Erickson	Rosauers Grocery
Bill Martin	Cabinet Resource Group
Michael Garrity	Alliance for Wild Rockies, Helena
Louisa Wilcox	Natural Resource Defense Council, Bozeman
Malcolm Edwards	Libby Ranger District
Sarah Canepa	Yaak Valley Forest Council, Troy
Rod Kramer	Adventure Cycling, Missoula
Tony Barget	Mayor of Libby

C. Engineering review of the existing corridor compared to current design standards – The existing roadway alignment was compared to current standards and areas that do not meet current standards have been identified.

   The issues identified included horizontal and vertical curves that do not meet standards, areas with sight distance (clear zone) deficiencies, side slopes that do not currently have adequate guard rail and/or shoulder. Where shoulders do exist, the widths do not meet safety standards.

D. Public and agency coordination – Coordination with the general public and the resource agencies occurred throughout the study.

   Feedback from the public and agencies was used to identify corridor problems as well as potential solutions. Several meetings occurred; these are listed in detail in Section 8.

E. Geotechnical Study – A Preliminary Geotechnical Report was completed as part of this study.

   Findings of this report have been included in this Corridor Study and the report is included in full as Appendix B. Slope stabilization and encroachment of the existing roadway into Pipe Creek are two of the key issues identified in the report. Slope stabilization and rockfall mitigation techniques, which could include slope flattening, rock bolting and netting, rockfall catchment ditches and barrier fences, will be required along the roadway if it becomes a construction project. The actual placement and selection of appropriate mitigation measures will depend on a complete field investigation and geotechnical study during a design phase if the road is programmed for a highway improvement project in the future.

F. Preliminary Biological Resources Investigation – A Preliminary Biological Resources Investigation was completed as part of this study to identify the biological resources near the corridor.

   Results of the investigation have been included in this Corridor Study and are detailed in Appendix C. Numerous species of wildlife and vegetation are described in the roadway corridor, as well as the aquatic resources and wetlands.

G. Preliminary Wildlife Habitat Linkage Analysis – A Preliminary Wildlife Habitat Linkage Analysis was completed as part of this study to identify the wildlife linkage zones near the corridor. Results of the investigation have been included in this Corridor Study.

   Three wildlife linkage areas were identified within the corridor but due to projected 2030 traffic volumes, traffic that may result from recommended roadway improvements are not anticipated to be an impediment to wildlife movements.

Problems Identified in the Corridor

The following problems for Hwy 567 between RP 6.1 and RP 20.1 have been identified during this corridor study. Each of these problems is described in the paragraphs that follow. Specific locations of these problem areas are identified on the Roadway Inventory Plans (Volume II of this Corridor Plan).

- Narrow and inconsistent roadway width throughout the corridor
- Lack of adequate signing and striping
- Substandard horizontal and vertical curvature
- Substandard side slopes (both cut and fill)
- Lack of or deteriorating guardrail
- Dense vegetation next to the roadway limits the ability of the sun to melt the snow and ice
- Rocks falling onto the road creating a hazard for motorists

Narrow Roadway Width throughout the Corridor
The existing roadway has an average width of 20 ft. Current standards for this type of facility recommend a roadway width of 24 ft. The narrowness of the Hwy 567 roadway makes snow removal and storage difficult in the winter months and also does not allow much room if there is a stalled vehicle. It also poses a problem for routine maintenance activities. The inconsistent roadway width, the roadway varies in width from 15 feet to 26 feet, does not allow for consistent driver expectancy. For example, the changes in width along the roadway may cause the driver to slow down quickly as the road narrows. The lack of roadway shoulders is also a direct result of the narrow roadway, and can be hazardous at times since there is insufficient room for vehicles to pull off the road in the event of an emergency.

Lack of Adequate Signing and Striping
The existing roadway does not have any paint striping and few signs where there are sharp curves or steep slopes. One of the public suggestions was to paint a centerline in the roadway to keep cars on the proper side of the road.

Substandard Horizontal and Vertical Curvature
Hwy 567 was originally built as a logging road and was not intended for public use. Many of the existing horizontal and vertical curves do not meet current design standards. The horizontal curve near RP 11 has been identified as a particular problem area because of the sharpness of the curve. Accident data indicates that this area has a higher frequency of accidents than other areas of the corridor.

Substandard Side Slopes (both cut and fill)
Much of the corridor has side slopes that are steep and do not meet current standards. This poses a safety issue for vehicles if they run off the road.

Lack of or deteriorating guardrail
In areas where side slopes can not be graded to meet current standards, shielding with guardrail should be considered. Much of the existing corridor does not have guardrail and in places where guardrail does exist in many cases it is in a poor condition. MDT is planning on replacing the existing guardrail between RP 10.8 and RP 11.2, it is anticipated this replacement will be completed in 2008.

Dense vegetation next to the roadway limiting the ability of the sun to melt the snow and ice
Hwy 567 is located in the Kootenai National Forest and is surrounded by dense vegetation on both sides of the roadway. Tall trees located close to the edge of the road limit the amount of sunlight that hits the road, particularly in the winter. This lack of sunlight means that ice and snow take longer to melt. This is an issue all along the study corridor.

Rocks falling onto the road creating a hazard for motorists
There are locations along the corridor where rocks are falling onto the roadway. This creates a hazard for motorists, particularly because the road is narrow and driving around the rocks puts the motorist into the opposing lane of traffic.

Improvement Options

To minimize impacts to the environment, the environmental issues within the project corridor were identified and located. Detailed discussion of environmental issues in the corridor is included in Chapter 4 of this Corridor Study. The alternatives development and screening process intended to find the environmentally least damaging alternative that still fixes the corridor problems.

Several improvement options were developed to address the problems identified in the corridor and are listed below. A detailed description of each option is included in Chapter 6.

- Improvement Option 1 – Full Reconstruction
- Improvement Option 2 – Rehabilitation with minor widening to 24 feet
- Improvement Option 3 – Rehabilitation with no minor widening
- Improvement Option 4 – Spot Improvements

- Improvement Option 5 – Snow Storage Option
- Improvement Option 6 – Rehabilitation with Minor Realignments

Management Strategies

As part of this study various resource management strategies were discussed which are not included as part of the improvement options mentioned above. Following is a summary of these strategies:

- Snow Removal – Rather than widening the roadway prism to allow for snow storage, we investigated an option of purchasing modern snow removal equipment that throws the snow away from the road. This equipment is very expensive and exceeds budget limitations for Lincoln County snow removal. This is a strategy that Lincoln County can implement at any time in the future if it becomes financially feasible.
- Grizzly Bears – One of the problems identified by the resource agencies during this study is the fact that bears like to eat trash and other human food which puts them in harms way. Better management of trash or other items bears like to eat could help to reduce this problem and would lessen the chances of Grizzly Bears interacting with humans and being killed. This strategy will be discussed at the final public meeting for this study. Local communities and others are also encouraged to promote this management strategy. A type of neighborhood watch program was also discussed to discourage poachers from killing Grizzly Bears. Details of this strategy were not discussed but the concept is to have residents watch out for the protection of the Grizzly Bears by discouraging and reporting poaching activities to the proper authorities. This strategy will also be discussed at the final public meeting for this study.

Recommended Corridor Improvements

As a result of the discussion at the Alternatives Workshop, a new option was developed and is recommended for implementation within the corridor. Improvement Option 6 is described in detail in Section 6.6 and includes the following elements:

- From RP 6.1 to RP 7 the road is already widened in this section.
- From RP 7 to RP 17 rehabilitate and minor widening of the roadway to a 24 foot top width (see Figure 14).
- At RP 8 and RP 11 realign the road centerline to increase safety (see Figure 15).
- From RP 17 to RP 20.1 rehabilitate and minor widening of the roadway to a 22 foot top width to reduce impacts to the natural environment (see Figure 16). A design option from RP 17 - 19 that was evaluated during the Alternatives Screening Agency Workshop included reduction of the top width to 22 feet. This roadway width was discussed as a possible means for future consideration, to reduce impacts to the natural environment. A design option from RP 19 – 20.1 that was evaluated during the Alternatives Screening Agency Workshop included reduction of the top width to 20 feet. This narrower roadway width was discussed as a possible means for future consideration, to reduce impacts to the natural environment.
- Design Values identified in AASHTO's Geometric Design of Very Low Volume Roads may be used to identify and justify design criteria exceptions that could be used to reduce impacts to the natural environment – see Design Criteria Table 13.
- Install warning signs as shown in Table 15.
- Use 6 inch pavement striping to reduce speeds.
- Flatten side slopes or install guardrail as shown in Table 14.
- Create a "V-ditch" where possible to help with snow storage.
- The actual method used to rehabilitate the existing pavement (full depth reclamation, foam mix, cold in place recycle, or some other method) will be determined at a later date after sufficient testing of the existing roadbed has been made, and given the nature of the facility. The cost estimate prepared for this option includes costs to cover whatever rehabilitation method is chosen.

The estimated cost of Option 6 is $13.5 million in 2006 dollars as shown in the cost estimate. The detailed cost estimate in Appendix F also includes a cost breakdown for various segments of the corridor for this option, allowing for a phased implementation approach as funding allows. Current funding availability is approximately $5,600,000. The following table summarizes the cost breakdown for Option 6.

Summary of Costs

	Roadway - 2006 Dollars	Right of Way - 2006 Dollars	Total - 2006 Dollars	Total - 2012 Dollars	Total Cost including 12% Indirect Cost Recovery - 2012 Dollars
Option 1 - Full Reconstruction	$ 22,711,542	$ 2,015,490	**$ 24,727,032**		
Option 2- Rehab with widening to 24'	$ 9,832,487	$ 333,500	**$ 10,165,987**		
Option 3 - Rehab with no widening	$ 5,604,001	$ 94,041	**$ 5,698,042**		
Option 4 - Spot Improvments	$ 187,501	$ -	**$ 187,501**		
Option 5 - Snow Storage Widening	$ 444,778	$ 5,750	**$ 450,528**		
Option 6 - Corridor Plan	$ 15,280,000	$ 219,000	**$ 15,500,000**	**18,510,000**	**20,730,000**
Corridor Plan Re-align RP 8	$ 890,000	$ 6,000	**$ 900,000**	**1,070,000**	**1,200,000**
Corridor Plan Re-align RP 11	$ 1,110,000	$ 6,000	**$ 1,110,000**	**1,330,000**	**1,490,000**
Corridor Plan Segment 1 - RP 7 to RP 12	$ 4,970,000	$ 52,000	**$ 5,020,000**	**5,990,000**	**6,710,000**
Corridor Plan Segment 2 - RP 12 to RP 17	$ 4,910,000	$ 161,000	**$ 5,070,000**	**6,050,000**	**6,780,000**
Corridor Plan Segment 3 - RP 17 to RP 20.1	$ 6,330,000	$ 6,000	**$ 6,330,000**	**7,560,000**	**8,470,000**

Notes: 1) Costs inflated by 3% per year to obtain 2012 costs 2) Indirect Cost Recovery rate estimated, and may vary from year to year

Option 6 Advantages:

- Corrects the major horizontal, vertical, and roadside deficiencies identified.
- Addresses safety concerns identified by providing improved pavement condition, consistent roadway width, safer curves, and guardrail.
- Less expensive than a full reconstruction - Option 1 (see Appendix F for detailed cost estimate breakdown).
- Is in line with public perception regarding the nature of the road.
- Provides room for snow storage to address the problem identified by Lincoln County Maintenance.
- Can adequately handle anticipated traffic volumes.
- Takes steps to minimize impacts to surrounding natural environment. These steps could include such things as improvements to the curve at RP 11 to address the debris that currently ends up in the adjacent stream due to recurring rock fall at RP 11, wider striping to assist in driving speeds decreasing, and minimizing impacts to wildlife linkage zones.

Option 6 Disadvantages:

- Potential minor impacts to the surrounding natural environment, including parts of the Grizzly Bear distribution area (GBDA), Wildlife Linkage zones (WLZ), and Pipe Creek (see sheet 3 in the "Roadway Inventory" sheets in Volume 2 where portions of Hwy 567 Pipe Creek Road are within the GBDA, and WLZ. Because development is anticipated to remain low in density and projected traffic volumes are well below the threshold of 4,000 vehicles per day (see Section 4.10.5), it is anticipated that minimal influence to the WLZ or GBDA will result from Option 6, and there will still be some minor impacts to wildlife from daily traffic.
- Will require closing the road periodically during construction, closures will be temporary and coordinated with Lincoln County and the USFS.

Next Steps

The following identifies the next steps that will occur for Hwy 567 corridor from RP 6.1 to RP 20.1.

- Copies of this Corridor Study will be made available for public and agency review for 30 days
- Public and agency comments will be addressed and this Corridor Study document will be finalized in December 2007
- MDT will confirm project scope with the County

- MDT will program recommended project based on available funding
- The environmental process will be completed, then the project will move into detailed design and construction of improvements
- Construction is expected to begin once funding becomes available

As part of the Project programming Public Involvement will be continuous throughout programming Project and environmental review process.

1.0 Introduction

1.1 Purpose

The purpose of this study is to develop a comprehensive, long-range plan for managing and improving the corridor. It will be a collaborative process with local jurisdictions, other agencies and the public in identifying transportation problems and the most efficient and effective solutions to them. The process will also provide a means for facilitating resolution of major issues before specific project programming and development begin.

The existing geometrics are challenging in terms of both vertical and horizontal alignments through a mountainous terrain and abutting Pipe Creek at various points along the route. Consequently, the corridor study will evaluate the feasibility of improving the corridor including assessing a range of low-level safety type improvements through major reconstruction. Activities will include researching existing conditions; documenting existing and projected environmental, geotechnical and land use conditions; forecasting future growth; identifying goals and analyzing alternatives for the corridor from several perspectives, constructability, financial feasibility, and public acceptance; and recommending improvements and management strategies for the existing and long-term safety and operation of the corridor.

This document discusses the findings and recommendations for the Libby North Corridor conducted by PB Americas, (formerly Parsons Brinckerhoff Quade and Douglas) for Montana Department of Transportation (MDT) between July 2006 and June 2007. The corridor study process evaluated existing conditions of the Highway (Hwy) 567 (locally known as Pipe Creek Road) corridor and made recommendations for improving Hwy 567 within the study limits.

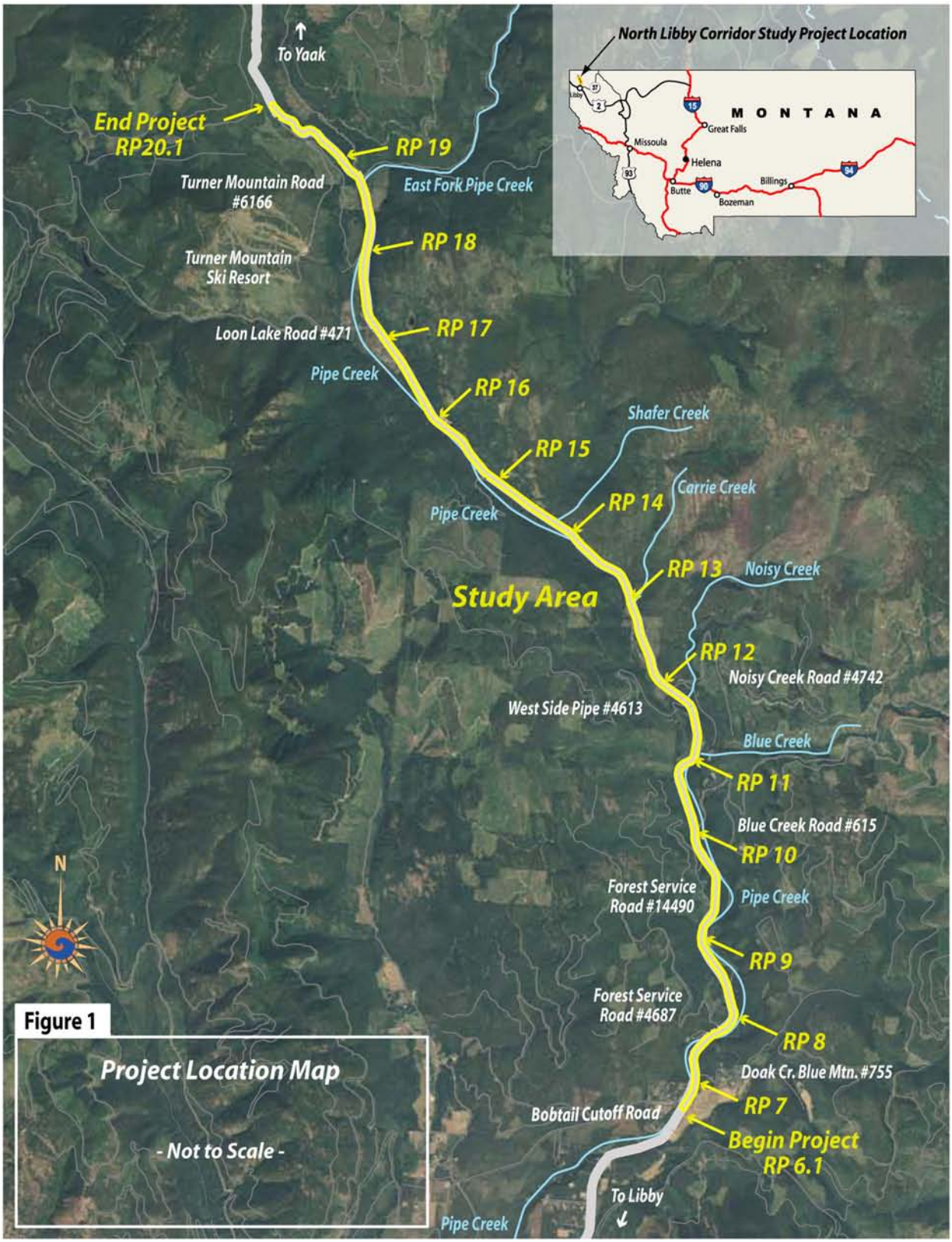
1.2 Location

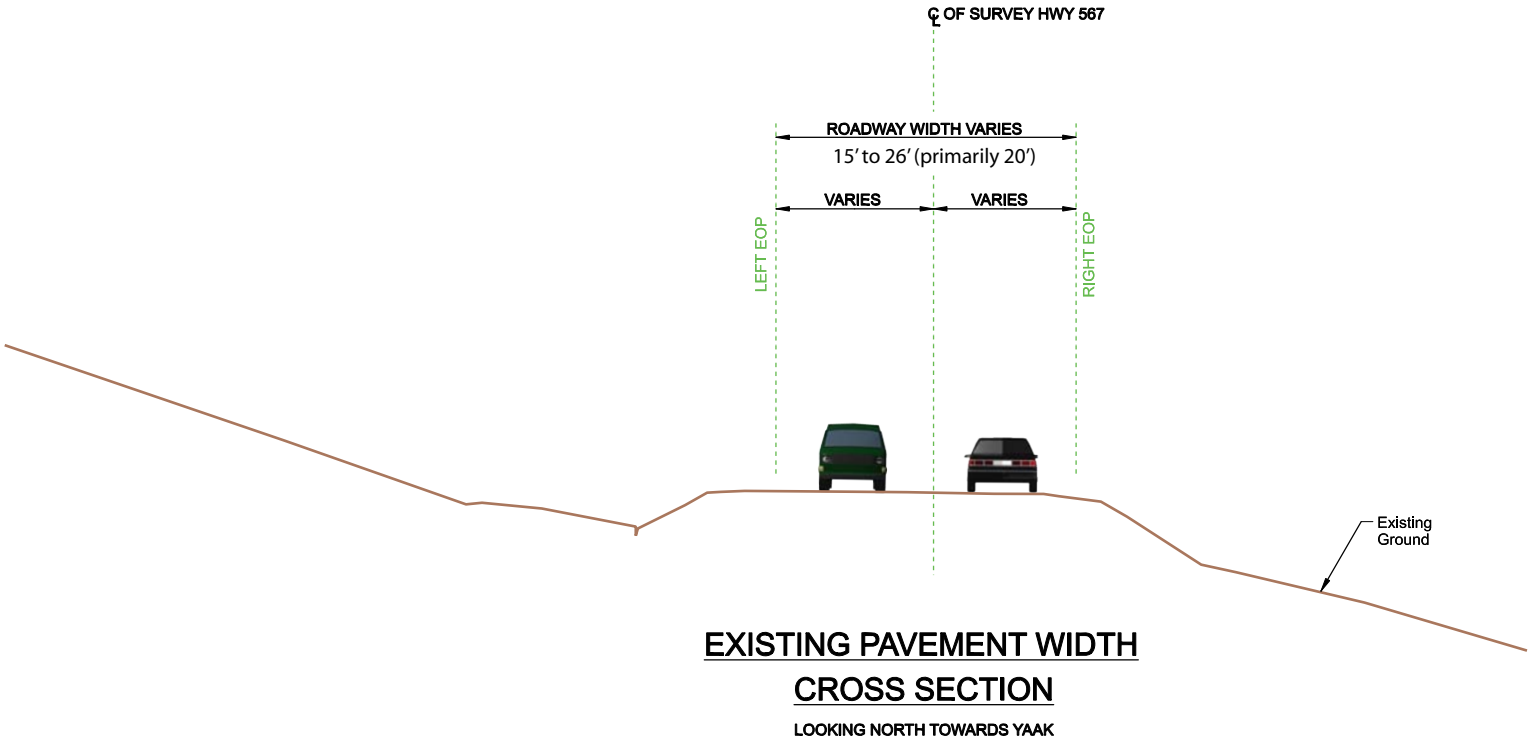
Hwy 567 is located in northwest Montana and runs between the City of Libby and the community of Yaak. The 14-mile section of Hwy 567 included in this study is from RP 6.1 near the Bobtail Cutoff Road to RP 20.1 near the Turner Mountain Road (see Figure 1). Hwy 567 is located in the Kootenai National Forest (designated as Forest Highway 67) in the Cabinet-Yaak Mountains. The road provides access to Forest Service lands for skiing, hunting, camping, and hiking activities. The road has historically been used for logging and that use continues today.

1.3 Study Background and Area

Hwy 567 is a two-lane roadway functionally classified as a rural major collector and is part of the Montana Secondary Highway System, see Figure 2 for existing typical cross-section. Lincoln County, the U.S. Forest Service, and MDT all desire to evaluate the existing conditions of the road to determine what, if any, improvements should be made. In July 2006 MDT retained PB to complete this Libby North Corridor Study.

The study area begins at RP 6.1 (Bobtail Cutoff Road) and runs 14 miles to RP 20.1 (Turner Mountain Road). The study area is 100 meters (328 ft.) wide centered off the centerline of the Hwy 567 Present Traveled Way (PTW). A wider study area was used to analyze wildlife and other environmental resources due to a need to assess habitat and indirect impacts.


North Libby Corridor Study Project Location
MONTANA
Libby
Missoula
Great Falls
Helena
Butte
Billings
Bozeman
To Yaak
End Project
RP20.1
RP 19
Turner Mountain Road
#6166
East Fork Pipe Creek
RP 18
Turner Mountain
Ski Resort
RP 17
Loon Lake Road #471
Pipe Creek
RP 16
Shafer Creek
RP 15
Carrie Creek
RP 14
Pipe Creek
RP 13
Noisy Creek
Study Area
RP 12
Noisy Creek Road #4742
West Side Pipe #4613
Blue Creek
RP 11
Blue Creek Road #615
RP 10
Forest Service
Road #14490
Pipe Creek
RP 9
Forest Service
Road #4687
RP 8
Doak Cr. Blue Mtn. #755
RP 7
Bobtail Cutoff Road
Begin Project
RP 6.1
To Libby
Pipe Creek
N
Figure 1
Project Location Map
- Not to Scale -



EXISTING PAVEMENT WIDTH CROSS SECTION

LOOKING NORTH TOWARDS YAAK

Figure 2

Existing Typical Cross-Section

2.0 Study Objectives and Corridor Needs

The study objectives discussed here were identified at the beginning of the study process. These goals and objectives were further refined and are outlined later in this document to identify high level needs based on findings through the study process, analysis and public and agency input.

Objectives of the study included the following:

- Document existing conditions –roadway & environmental
- Project future growth
- Identify corridor issues
- Develop corridor goals and possible improvement options
- Analyze future transportation improvements based on impacts, constructability, public acceptance, & financial feasibility
- Recommend improvement options and management strategies for long-term safety and operation of the corridor

The needs and additional objectives for the corridor identified during the study process are:

- Improve safety conditions and decrease accidents
  - Improve geometric elements
  - Address inconsistent roadway widths
  - Improve winter driving and maintenance conditions

- Minimize impacts to the threatened and endangered species
  - Maintain existing wildlife linkage zones

- Maintain character of corridor (mountain roadway)
  - Balance the needs of all users (residents, emergency responders, logging, truckers, recreational)
  - Provide a roadway that is an asset to Libby and Yaak

This study has identified corridor problems and potential solutions and has developed an recommended implementation option to address the problems which currently exist in the Hwy 567 corridor. Public and agency coordination has been an important part of this study.

3.0 Existing Roadway and Drainage Characteristics

3.1 Highway 567 Roadway Users

The primary users of Hwy 567 are the local land owners along Pipe Creek, Yaak residents commuting to Libby, logging trucks, and recreational users accessing Turner Mountain Ski Resort and other Forest Service owned lands. The road is used year around for recreation. Generally, during the non-winter months, campers, bikers, hikers, and hunters travel the road. During the winter months skiers, snowmobile riders, snow-shoe hikers, and those involved in other types of recreation travel the road.

Hwy 567 is a transportation link between Yaak and Libby. The road is the most direct route for emergency services to access Yaak from Libby. There is an additional access along Hwy 508, west of Libby. The difference in distance between the two routes is 21 miles and the Hwy 508 route takes only slightly longer to travel depending on weather conditions. During winter months especially Hwy 567 as an emergency response route between Yaak and Libby can be challenging. Consequently, emergency vehicles will sometimes access Yaak

from Troy if an incident is in or near the Turner Mountain Ski area or when Hwy 567 is not maintained North of Turner Mountain Ski Area. [1].

3.2 Existing Traffic

In 2004, approximately 160 vehicles per day traveled Hwy 567. This traffic volume does not exceed the current capacity of the roadway. A typical two lane secondary type roadway has the capacity of approximately 12,000 vehicles per day. However, given the terrain and variable roadway widths, and character of the existing roadway, a more realistic capacity for Hwy 567 would be approximately 4,000 to 5,000 vehicles per day. The corridor does not currently experience delays or congestion during the peak travel periods. Therefore, Hwy 567 does not require additional capacity.

3.3 Right of Way and Jurisdiction

The existing road is located mostly on Forest Service property, with a few sections of the roadway located on private property. Approximately 83 percent of the land within a 5-mile radius of the study corridor is under USFS ownership. Plum Creek Timber Company has holdings of about 12 percent while smaller private tracts occur in small clusters immediately adjacent to the roadway. Portions of Hwy 567 are currently located within a Forest Service easement, which is on average 20 meters (66 ft.) wide. Property ownership is shown in Volume II: Roadway Inventory Drawings (separate deliverable). Current maintenance of the roadway within the study area is provided by the Forest Service although Lincoln County plows snow through the winter time.

3.4 Physical Characteristics

Hwy 567 was originally constructed as a logging road with a gravel surface. The road is currently paved with two lanes. Sections of the roadway are narrow and curves on the road are sharp and do not meet the 70 kph [45 mph] design standard. The roadway has a number of locations with substandard stopping sight distances which make driving hazardous, especially during winter months. Photographs of the study corridor are located in Appendix A, as well as within the Preliminary Geotechnical Corridor Study Report in Appendix B.

Over time the Forest Service has improved the road with bituminous surface treatments, asphalt and chip seal overlays. Some sections of the pavement are failing and some sections of the shoulders are sloughing off. Sections of guardrail are damaged and have fallen over. A pavement conditions report for the study area has recommended major rehabilitation of the driving surface given the existing poor road conditions.

Hwy 567 follows the course of Pipe Creek. Pipe Creek crosses under the road at various points along the corridor. The terrain is heavily forested on both sides of the road and the terrain varies from gently rolling to mountainous. A few big cuts and fills occur where the road approaches Pipe Creek. Forest Service roads that provide access to recreational and logging areas intersect Pipe Creek Road at various locations along the corridor.

3.5 Design Standards

Table 1 lists the existing geometry criteria evaluated for the Libby North Corridor, these criteria are ones used generally for rural collector roads. The criterions were used to evaluate whether the road meets current design standards.

[1] Source: Personal Communication between Mark McGill, Lincoln County EMS and Lani Eggertsen-Goff, PB, September 2007.

Table 1 - Existing Geometrics Evaluation Criteria

Design Element			Manual Section	Design Criteria
Design Controls	Design Forecast Year		8.4	2030
	Design Speed	Mountainous	8.3	45 mph (70km/h)
	Level of Service		8.4	B
Roadway Elements	Design Year Traffic	Current AADT	N/A	350
		DHV		44
	Roadway Width (Travel Lanes & Shoulders)		11.2	28 ft (8.4 m)
	Cross Slope	Travel Lane	11.2	2%
		Shoulder		2%
	Median Width		11.3	N/A
Earth Cut Section	Inslope		11.4	4:1 (6.0 ft - 2.0 m)
	Ditch	Width	11.4	10 ft (3.0 m)
		Slope		20:1
	Back Slope; Cut Depth at Slope Stake	0'-5' (0-1.5m)	11.4	5:1
		5' - 10' (1.5m - 3.0m)		3:1
		10' - 15' (3.0m - 4.5m)		2:1
		15' - 20' (4.5m - 6.0m)		1.5:1
		> 20' (6.0m)		1.5:1
Earth Fill Slopes	Fill Height at Slope Stake	0'-10' (0-3.0)	11.4	4:1
		10' - 20' (3.0m - 6.0m)		3:1
		20' - 30' (6.0m - 9.0m)		3:1
		> 30'(9.0m)		2:1
Alignment Elements	DESIGN SPEED		N/A	45 mph (70km/h)
	Stopping Sight Distance		8.6	360 ft (105m)
	Passing Sight Distance		8.6	1625 ft (490m)
	Minimum Radius (e=8.0%)		9.2	590 ft (175m)
	Superelevation Rate		9.3	emax = 8.0%
	Vertical Curvature (k-value)	Crest	10.5	61 (17 metric)
		Sag		79 (23 metric)
	Maximum Grade	Mountainous	10.3	10%
	Minimum Vertical Clearance		10.6	16.5 ft (5.05m)

(1) All Information listed here was taken from Figure 12-5 "Geometric Design Criteria for Rural Collector Roads" Montana Department of Transportation Road Design Manual Chapter 12.

3.6 Roadway Deficiencies

The existing physical and geometric characteristics of Hwy 567 were evaluated for the study area to identify areas that do not meet the following MDT design standards:

- geometric
- sight distance
- horizontal and vertical approach
- roadside/clear zone

This analysis was necessary to identify areas with safety concerns and substandard operations which potentially lead to decreased driver safety and accidents. To identify the substandard areas, an MDT survey file of the roadway was used with Geopak Civil Design software package. A best fit horizontal and vertical alignment was developed relative to the surveyed center of the road. The horizontal and vertical alignments were evaluated based upon the MDT design criteria of a rural collector road. The findings of the analysis are summarized below.

3.6.1 Horizontal Alignment

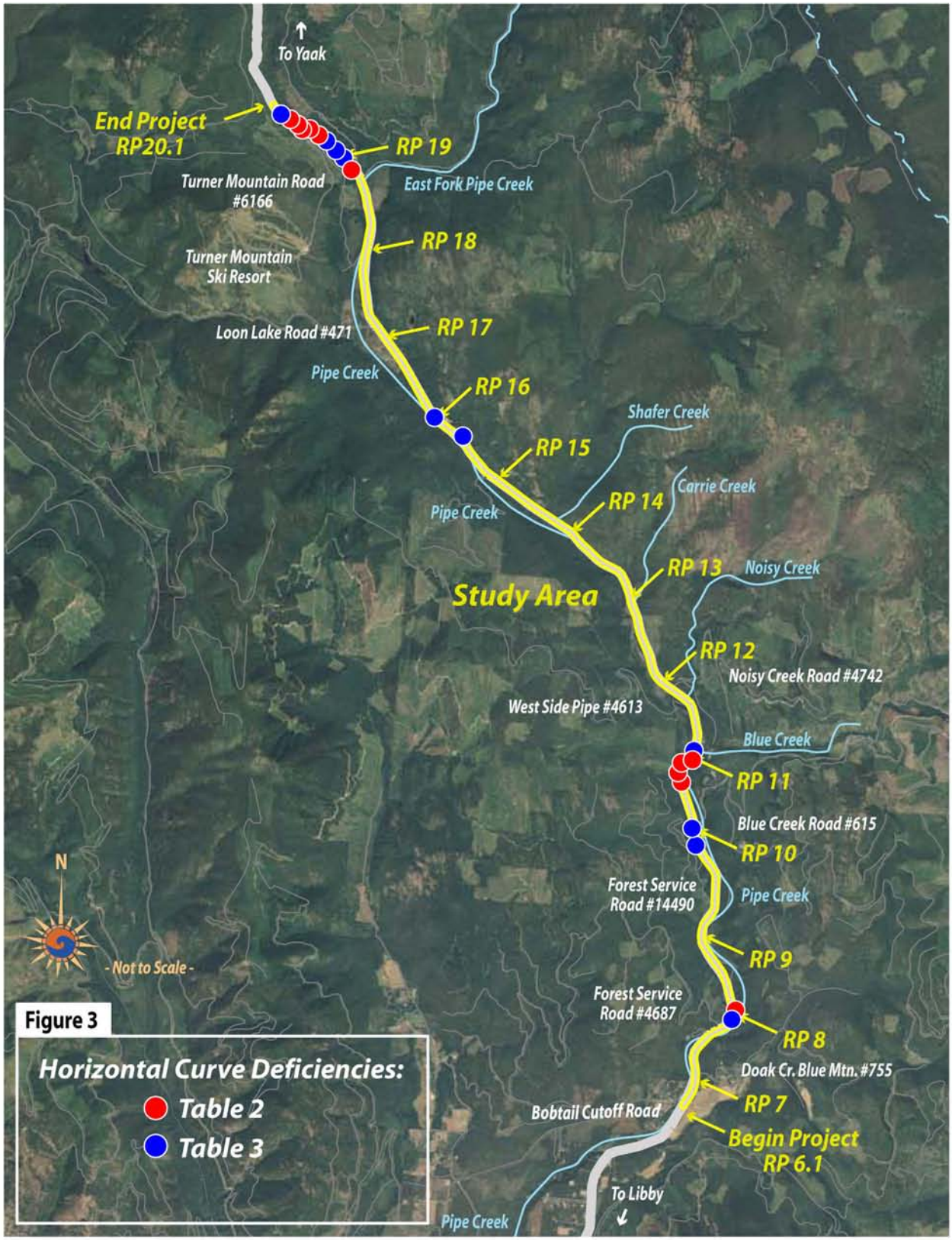
In many areas along the corridor the analysis showed the existing horizontal alignment currently meets MDT design standards. However, in a few locations the horizontal alignment curves did not meet the MDT design standards. The locations and deficiencies are identified in Tables 2 and 3 and Figure 3.

Table 2-- Horizontal Alignment Substandard Curves

Reference Post	Deficiency Description
8	The horizontal curve is too sharp for 70 kph (45 mph). It is acceptable for 60 kph (37 mph)
10.7 & 10.8	Three curves in this section are too sharp for 70 kph (45 mph). They are acceptable for 60 kph (37 mph).
11.0	The horizontal curve is too sharp for 70 kph (45 mph). It is acceptable for 50 kph (30 mph).
19.1	The horizontal curve is too sharp for 70 kph (45 mph). It is acceptable for 60 kph (37 mph)
19.5 to 19.9	A series of curves in this section are too sharp for 70 kph (45 mph). They are acceptable for 40 kph (25 mph), with the sharpest acceptable for 30 kph (20 mph),

Table 3 – Horizontal Alignment Substandard Sight Distance

Reference Post	Deficiency Description
8	Insufficient Horizontal Stopping Sight Distance (SSD) for 70 kph (45 mph). SSD is acceptable for 50 kph (30 mph).
9.7	Insufficient Horizontal (SSD) for 70 kph (45 mph). SSD is acceptable for 60 kph (37 mph).
10	Insufficient Horizontal (SSD) for 70 kph (45 mph). SSD is acceptable for 60 kph (37 mph).
11	Insufficient Horizontal (SSD) for 70 kph (45 mph). SSD is acceptable for 40 kph (25 mph).
16	Insufficient Horizontal (SSD) for 70 kph (45 mph). SSD is acceptable for 60 kph (37 mph).
19.1-19.9	A series of curves in this section has insufficient Horizontal (SSD) for 70 kph (45 mph). The SSD for the majority of these curves is acceptable for 60 kph (37 mph) with three having SSDs acceptable for only 40 kph (25 mph).


To Yaak
End Project
RP20.1
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#6166
East Fork Pipe Creek
RP 18
Turner Mountain
Ski Resort
RP 17
Loon Lake Road #471
Pipe Creek
RP 16
Shafer Creek
RP 15
Carrie Creek
RP 14
Pipe Creek
RP 13
Noisy Creek
Study Area
RP 12
Noisy Creek Road #4742
West Side Pipe #4613
Blue Creek
RP 11
Blue Creek Road #615
RP 10
Forest Service
Road #14490
Pipe Creek
RP 9
Forest Service
Road #4687
RP 8
Doak Cr. Blue Mtn. #755
RP 7
Bobtail Cutoff Road
Begin Project
RP 6.1
To Libby
Pipe Creek
N
- Not to Scale -
Figure 3
Horizontal Curve Deficiencies:
Table 2
Table 3

3.6.2 Clear and Roadside Zone

The deficiencies analysis identified areas with substandard clear zones. The clear zone is the area of the road that a normal driver could use to recover from going off the side of the road. It is typically measured from the outer edge of the traveled way. The deficiencies analysis revealed a number of clear zone issues along this road. A majority of these areas have fill slopes that are too high for the steepness of the slope. MDT design standards recommend that these situations warrant shielding with guardrail. Areas that were identified with clear zone/roadside deficiencies are shown on Figure 4 and in Tables 4, 5 and 6.

Table 4 -- Substandard Clear/Roadside Zones

REFERENCE POST	SIDE OF ROAD	DEFICIENCY	WARRANTS GUARDRAIL
7.8 to 8.1	East	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
8.1 to 8.3	Both	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
8.3 to 8.4	East	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
8.5 to 8.6	East	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
8.7 to 9.0	East	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
9.6 to 9.8	East	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
9.9 to 10.0	East	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
10.5 to 10.6	East	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
11.0 to 11.1	East	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
11.5 to 11.6	West	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
12.1 to 12.3	West	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
12.6 to 12.9	West	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
13.8 to 13.82	West	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
15.2 to 15.3	West	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
15.3 to 15.6	West	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
15.9 to 16.2	West	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
16.6 to 16.7	Both	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
17.7 to 17.8	West	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
18.0 to 18.3	West	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
18.7 to 18.9	West	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes
18.8 to 20.0	East	Fill height with 2:1 slope to exceed 4.9 feet (1.5 m)	Yes

Table 5 identifies areas that have cut ditch inslopes steeper than 4:1, and/or steep (greater than 3:1) cut backslopes, non traversable and not obstacle free (areas where tree hazards are too close to the road) start within the clear zone (3.0 meter (10 foot) minimum) of the traveled way.

Table 5 -- Cut Slopes/Ditch Slopes in Clear Zone Location Clear zone is 14 feet for a 4:1 ditch inslope

RP 8.1 to RP 8.2 west side – 2:1 (4:1 standard) ditch inslope used within the clear zone.
RP 8.2 to RP 8.4 both sides –2:1 or steeper cut backslope with tree hazards begins too close to the road.
RP 8.6 to RP 8.7 west side–2:1 or steeper cut backslope with tree hazards begins too close to the road.
RP 8.8 to RP 9.0 west side –2:1 or steeper cut backslope with tree hazards begins too close to the road.
RP 9.4 to RP 9.42 west side –2:1 or steeper cut backslope with tree hazards begins too close to the road.
RP 9.6 to RP 9.7 west side–2:1 or steeper cut backslope with tree hazards begins too close to the road.
RP 9.9 to RP 10.0 west side-ditch inslope varies from 3:1 to 2:1, and steeper than 3:1 cut backslopes, with tree hazards begins too close to the road.
RP 10.9 to RP 11.1 west side–2:1 or steeper cut backslope with rock hazards begins too close to the road.
RP 13.0 to RP 13.2 east side–2:1 or steeper cut backslope with hazards begins too close to the road.

Table 6 identifies the miscellaneous guardrail problems along the study corridor.

Table 6 -- Miscellaneous Guardrail Problem Locations

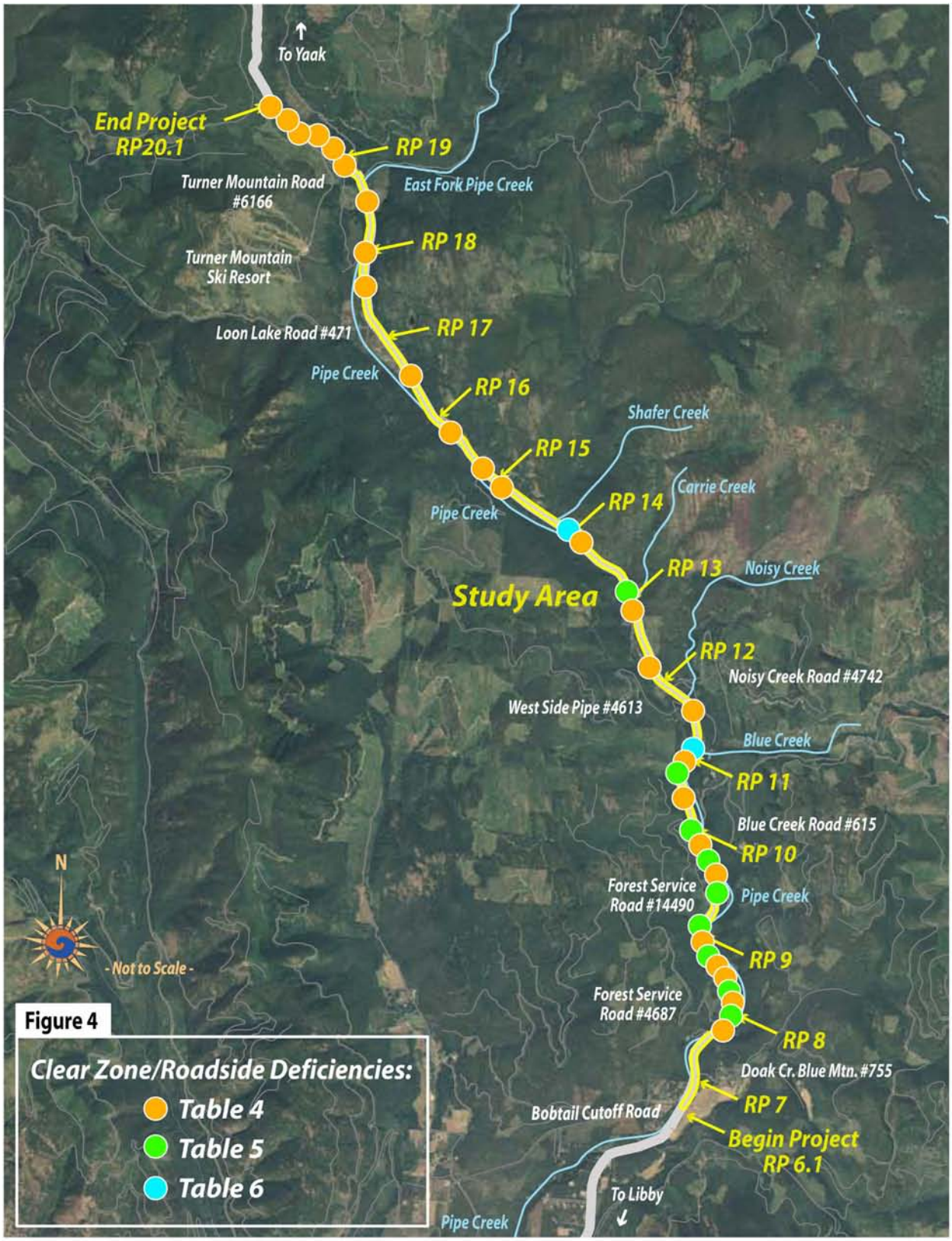
RP 11 – Damaged guardrail will be repaired during MDT Safety Project in 2007
RP 14.2 – Guardrail lengths are inadequate

3.6.3 Vertical Alignment

A best fit vertical alignment showed that most roadway grades are within acceptable limits, but a few vertical curves did not meet 70 kph (45 mph) stopping sight distance requirements. These vertical curves are shown in Table 7. "K" is a rate of vertical curvature used in AASHTO standards to determine the minimum length of a vertical curve for a given design speed and stopping sight distance.

Table 7 -- Vertical Alignment Substandard Curves

Reference Post #	Deficiency Description
RP 8.1	Sag vertical curve has a stopping sight distance (SSD) of 85m should be 105 m (K of 18 should be 23)
RP 8.7	Crest vertical curve has a SSD 85m should be 105m (K of 14 should be 17)
RP 9.7	Sag vertical curve has a SSD of 65m should be 105m (K of 16 should be 23)
RP 10.9	Sag vertical curve has a SSD of 65m should be 105m (K of 17 should be 23)
RP 12.7	Sag vertical curve has a SSD of 85m should be 105m (K of 18 should be 23)
RP 12.8	Sag vertical curve has a SSD of 65m should be 105m (K of 17 should be 23)
RP 12.84	Crest vertical curve has a SSD of 85m should be 105m (K of 13 should be 17)
RP 13.0	Crest vertical curve has a SSD of 85m should be 105m (K of 11 should be 17)
RP 14.3	Sag vertical curve has a SSD of 65m should be 105m (K of 17 should be 23)
RP 14.7	Sag vertical curve has a SSD of 65m should be 105m (K of 17 should be 23)
RP 15.2	Sag vertical curve has a SSD of 35m should be 105m (K of 7 should be 23)
RP 16.0	Crest vertical curve has a SSD of 50m should be 105m (K of 5 should be 17)
RP 16.1	Sag vertical curve has a SSD of 65m should be 105m (K of 17 should be 23)
RP 16.14	Crest vertical curve has a SSD of 65m should be 105m (K of 7 should be 17)
RP 16.2	Sag vertical curve has a SSD of 65m should be 105m (K of 14 should be 23)
RP 16.7	Sag vertical curve has a SSD of 85m should be 105m (K of 18 should be 23)
RP 16.73	Crest vertical curve has a SSD of 50m should be 105m (K of 6 should be 17)
RP 18.3	Crest vertical curve has a SSD of 85m should be 105m (K of 12 should be 17)
RP 18.4	Crest vertical curve has a SSD of 50m should be 105m (K of 4 should be 17)
RP 18.48	Sag vertical curve has a SSD of 65m should be 105m (K of 14 should be 23)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- Not to Scale -
Figure 4
Clear Zone/Roadside Deficiencies:
Table 4
Table 5
Table 6

3.6.4 Pavement Width

An analysis of the existing pavement widths showed that most of the alignment has an average width of 6.1 meters (20 feet), which is substandard for a rural collector. The width of a 10 foot lane width only allows for two ten foot lanes with no shoulders, unless the pavement width is greater than 20 feet. The actual pavement width varies between 15 feet in a few sections of the corridor and is as wide as 26 feet in some sections.

3.7 Geotechnical

A preliminary geotechnical field review was performed to determine the geotechnical issues along the corridor. Segments of the current alignment encroach on Pipe Creek, and in several areas this encroachment is accompanied by steep cut slopes on the opposite side of the roadway. Some of these cut slopes are in glacial till while others are in the steeply dipping bedrock. Any reconstruction design will need to address the slope stability issues in both the glacial till and rock cut slopes, and rockfall issues in the rock cut slopes. The glacial till slopes are subject to surface erosion and surface slope failure especially during spring break-up. The rock cut slopes are subject to failure when the existing bedding planes and joint patterns are undercut during construction.

Any reconstruction/realignment at R.P. 11 should be designed to mitigate the rockfall hazard at this location. Any rock cuts that will create a new rockfall should be designed with adequate catchment in the ditch and any other measures required to stabilize the slope (i.e. rock bolts, slope mesh, etc.). A detailed subsurface investigation will be required to design the geotechnical features of this corridor if it becomes a construction project.

The existing roadway from approximately RP 18.4 to 19.5 is located on a steep grade, has steep cuts and fills and is very curvy with short turn radiuses. The use of retaining walls in both cut and fill areas may be needed if reconstruction is proposed to meet current design standards. Slope stability analysis is needed for cut and fill areas and the retaining walls in this section of roadway. A more detailed analysis can be found in Appendix B.

3.8 Drainage

The study area is located within the Pipe Creek drainage. The drainage has a number of creeks and tributaries. Pipe Creek is the largest stream in the drainage with Noisy Creek, Schafer Creek, and East Pipe Creek as tributaries to Pipe Creek. Run off from Hwy 567 currently goes into the adjacent streams.

3.9 Hydraulic Structures

An analysis of the capacity of the existing culverts and bridges was performed for Pipe Creek and other drainage crossings to determine potential areas of concern for flooding. A hydrologic analysis of the streams was not performed. Federal Emergency Management Administration (FEMA) has mapped flood zones of "type A (Areas of 100-year flood; base flood elevations and flood hazard factors not determined" [2] all along Pipecreek within the study corridor. These flood zones often intersect or are in very close proximity to the existing Hwy 567. At locations where the roadway crosses or intersects flood zones all applicable State and Federal regulations that apply to these flood zones would be complied with in the event any construction or rehabilitation of the roadway occurs within flood zones.

However, based on a lack of historical flooding events, and the sizes of the existing channel, the presumption is that the existing culverts and bridges are adequately sized to accommodate flows in Pipe Creek and other drainage crossings. A stream hydrologic analysis would be recommended if a project is identified in the corridor. An appropriate hydraulic study will be completed if a project is implemented within the Libby North Corridor area. Table 8 below shows the location, structure and capacity of the culverts and bridges.

The bridge located at RP 7.4, called the Timberlane Bridge was inventoried by the US Forest Service and several deficiencies were identified. The recommended work shown in the Routine Road Bridge Inspection Report for

[2] U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Rate Map, Lincoln County, Montana Panels 500, 525, 610 and 650.

the Timberlane Bridge in Appendix G would address the deficiencies identified and would cost less than $30,000. The deficiencies identified are mainly cosmetic. The bridge is not functionally or structurally deficient.[3]

3.10 Crash Analysis

To gain a better understanding of the existing road conditions, a review of MDT crash data for the corridor was performed as part of this study. In addition to reviewing crash data, interviews were conducted to ask about non-reported accidents and problem areas. Five people were interviewed for the analysis (see Table 10). These people had first hand knowledge of the accident concerns on the corridor.

3.10.1 MDT Crash Analysis

The MDT Crash Data indicated there were 26 crashes from January 1, 1995 to March 31, 2006. As shown in Figure 5, 11 of the 26 accidents are clustered between RP 6.1 and RP 8.0. Average crash rates and severity index for the state and the study area are listed in Table 9. The average daily traffic volume from January 1, 1995 to December 31, 2004 was 157 vehicles.

Table 8 - Libby-Major Hydraulic Structures (larger than 24"CMP *)

Reference Post	Description	Drainage Crossed	Diameter (mm)	Upstream Invert (m)	Downstream Invert (m)	Length (m)	Slope (%)	Capacity (m3/s)	Capacity (cfs)
7.60	Bridge	Pipe Creek							
9.10	39" CMP Culvert	Road Drainage	990	824.122	821.963	19.689	10.97%	4.19	148.0
9.80	46" CMP Culvert	Road Drainage	1170	829.405	828.71	17.225	4.03%	3.96	139.8
9.90	33" CMP Culvert	Road Drainage	840	832.075	831.471	17.245	3.50%	1.53	54.0
10.70	36" CMP Culvert	Unknown	915	845.013	843.986	16.219	6.33%	2.58	91.1
11.80	Pipe Arch	Pipe Creek							
12.90	48" CMP Culvert	Carrier Creek	1220	887.487	887.037	12.328	3.65%	4.22	149.0
14.20	168" CMP Culvert	Shafer Creek	4270	900.077	899.72	17.459	2.04%	89.01	3143.4
15.20	36" CMP Culvert	Road Drainage	915	908.582	908.113	11.637	4.03%	2.06	72.7
16.70	36" CMP Culvert	Road Drainage	915	934.411	933.853	17.137	3.26%	1.85	65.3
18.80	129"CMP Culvert	East Fork Pipe Creek	3275	957.728	957.276	36.541	1.24%	34.21	1208.1
18.85	48" CMP Culvert	Road Drainage	1220	962.271	961.837	14.05	3.09%	3.88	137.0
18.86	150" CMP Culvert	Pipe Creek	3810	961.588	960.609	18.152	5.39%	106.77	3770.5
19.80	42" CMP Culvert	Road Drainage	1065	1034.006	1029.709	28.494	15.08%	5.97	210.8

* CMP = Corrigated Metal Pipe type culvert

Table 9 -- MDT Crash Data

STATEWIDE AVERAGE	RURAL STATE SECONDARY SYSTEM (Jan '95 – Dec '04)	STUDY AREA (Jan '95 – Dec '04)	STUDY AREA (Jan '05 – Mar '06)	STUDY AREA (Jan '95 – Mar '06)
All Vehicles Accident Rate	1.68	2.86		
All Vehicles Severity Index	2.39	2.91		
All Vehicles Severity Rate	4.02	8.32		
Total Recorded Accidents	**-**	**23**	**3**	**26**

[3] Personal communication between Wayne Noem, Secondary Roads Engineer, MDT and Lani Eggertsen-Goff, PB, October 9, 2007.

The following statistics and observations were obtained from MDT for the period January 1, 1995 through December 31, 2004.

Variations from Average Occurrence:

- 43.5% icy road conditions vs. 15.2% statewide average for rural state secondary
- 65.2% cloudy weather conditions vs. 32% statewide average for rural state secondary
- 17.4% snowy weather conditions vs. 6.7% statewide average for rural state secondary

The overall trend for this section of state secondary is loss of control on a curve, usually during snow/slush or icy roadway conditions. The snowy and icy conditions aggravate issues associated with a non-standard roadway alignment and width. Most of these crashes are single vehicle crashes and result in a collision with a roadside object or another vehicle. Also note that over 52% of the crashes in this section occurred at night.

3.10.1.1 Crash Summary

The following highlights the findings of the MDT Crash Analysis:

- Exceeding the speed limit or traveling too fast for the conditions attributed to almost half of the crashes on this road.
- Alcohol played a role in two of the 2005 crashes and a wild animal was involved in only one crash over the 11 year period.
- Eight (8) crashes involved a tree. Four (4) crashes involved a vehicle overturning with 3 of the 4 vehicles classified as small pickups.
- There were no reported fatalities on this road during the analysis years.
- Four (4) crashes occurred between reference posts 7.7 and 8.0. All of these crashes involved a single vehicle. These crashes were the result of inattentive driving and/or alcohol. Three (3) of these 4 crashes involved a tree and the remaining crash resulted in an overturned vehicle.
- There were two (2) crashes between reference posts 10.0 and 10.1. One of these crashes involved a northbound vehicle overturning on the east shoulder. This accident occurred at reference post 10.0. It is unclear if this one crash would warrant a barrier along the east shoulder. The other crash at this area involved a southbound vehicle running onto the embankment on the West.
- There were three (3) crashes between reference posts 11.0 and 11.4. All of these crashes involved southbound vehicles crossing the opposing lane and crashed into the East guardrail or overturned on the East shoulder. All of these crashes occurred during icy weather and two of these crashes involved vehicles traveling at speeds to fast for the conditions.
- Three (3) crashes occurred between reference posts 16.4 and 17.3. Two of these crashes involved an inattentive driver. Both vehicles were southbound and both vehicles hit a tree on the east shoulder. Both crashes occurred during clear weather. Loose gravel in the road contributed to one of these crashes. The other crash was a rear end collision during icy conditions.
- Four (4) crashes occurred between reference posts 18.20 and 18.80. All of these crashes involved a northbound vehicle and all involved snowy or rainy conditions. Excessive speed or inattentive driving contributed to three of the four crashes in this area.

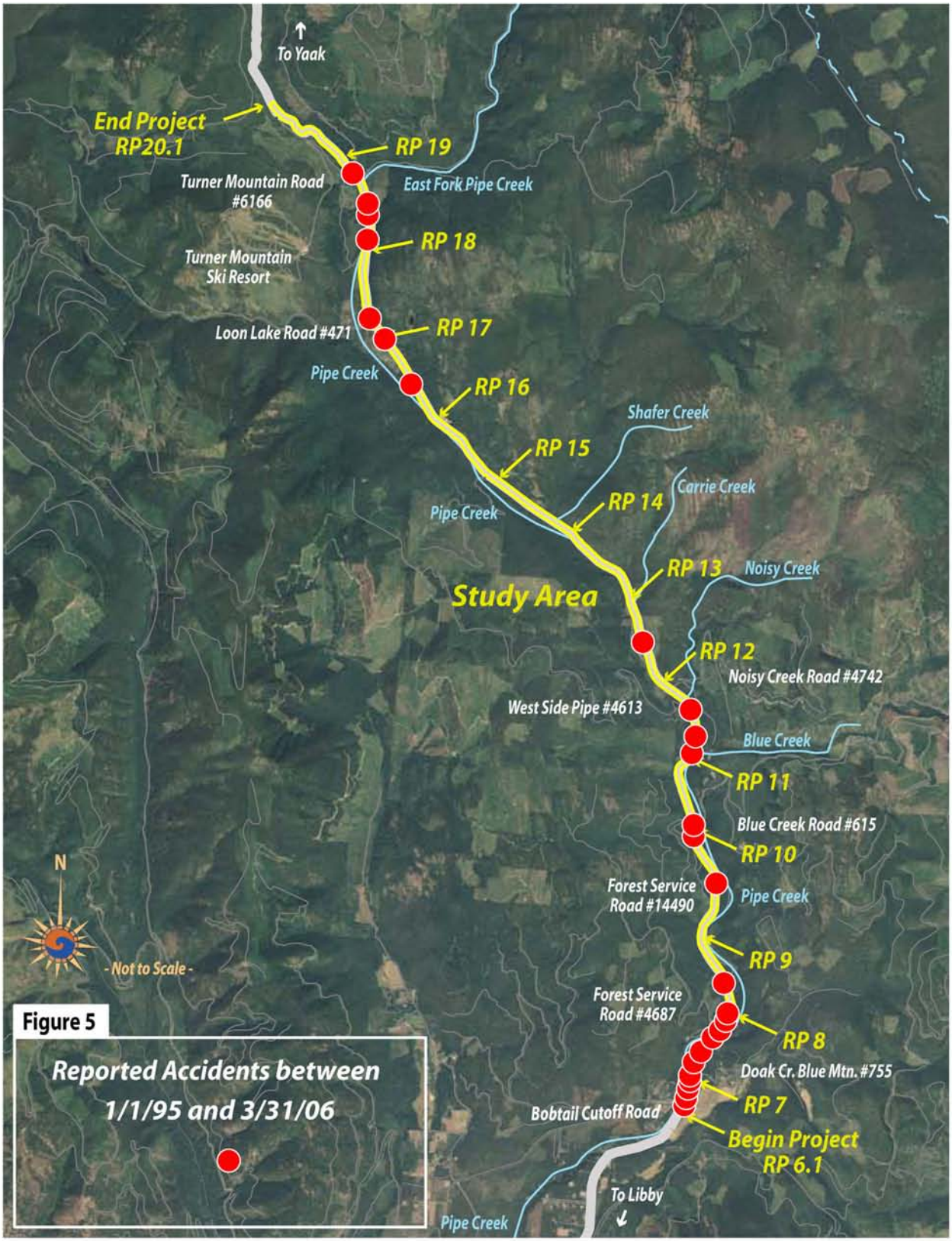
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Figure 5
Reported Accidents between
1/1/95 and 3/31/06

3.10.2 Summary of Crash Analysis Interviews

Questions asked during interviews and the answers provided from the five individuals that were interviewed are described in Table 10. The information received from these five interviews was not sufficient to draw any solid conclusions, but the information from these frequent roadway users gave opinions of the road. More technical data and analysis follows in this document in later sections. In general, most of the respondents indicated that RP 11 is a dangerous curve and winter travel time is more hazardous because of snow pack and ice. Most of the comments indicated that many accidents go unreported and no specific location for collision with wildlife was identified.

Table 10 -- Summary of Crash Interviews

Affiliation	How often do you drive the corridor?	Have you witnessed an accident on the corridor?	Are you aware of specific problem areas for accidents?	Winter time travel?	Wildlife involved accidents?	Frequency of non-reported accidents?	Alcohol related accidents?	Additional comments
Lincoln County Emergency Services	Weekly	Lots of rollovers and slide offs. The last fatality was three years ago.*	RP 11	Witnessed more accidents during winter. Increased traffic has resulted in more accidents.	Wildlife strikes occur along the roadway but not aware of a specific problem area.	Happens frequently. Locals will help pull vehicles back onto the road. EMS once responded to a roll over empty vehicle; the driver had walked away and left the scene.	Most of the accidents involve alcohol.	Improved emergency response access and response time would be a benefit to the corridor. Winter travel conditions make emergency response slower and more risky.
Lincoln County Roads	Weekly	Witnessed and helped on slide offs. Never seen a fatality.	RP 11. Problems with narrow roadway, sharp curve.	Witnessed more accidents during winter. Often deep snow, freezing rain on roadway creates dangerous travel.	Not aware of a specific areas where wildlife strikes occur at a higher frequency. Wildlife is everywhere along the corridor.	Most slide offs are handled by the locals and are not reported.	Not familiar with alcohol related accidents but could see that it could be a problem.	Pipe creek is a major road. Because it is a narrow road there are problems with getting snow off the road. Needed improvements include more areas for snow storage. The road cannot be plowed with a truck, too dangerous.

Table 10 -- Summary of Crash Interviews

Affiliation	How often do you drive the corridor?	Have you witnessed an accident on the corridor?	Are you aware of specific problem areas for accidents?	Winter time travel?	Wildlife involved accidents?	Frequency of non-reported accidents?	Alcohol related accidents?	Additional comments
Montana Highway Patrol	Frequently	Not a high accident roadway. He has witnessed slide offs but no fatalities.	No comment given.	Icy conditions have resulted in vehicle loss of control. Vehicles often slide off.	No comment given.	This happens often. The driver is DUI or has no insurance and their family and friends help them out. Wildlife strikes are often cleaned up by locals before MHP comes across the accident.	Alcohol related accidents have not been a problem. The clientele at the Red Dog is not a rowdy crowd.	This is a safe road to travel. The roadway forces drivers to go slow. Need guardrail in areas with steep drop offs.
Comm. Truck Driver/Pipe Creek Land Owner	Daily	Never witnessed a serious accident. Seen many slide offs.	RP 11. Problems with sharp curve, falling rock, narrow roadway.	Witnessed more accidents during winter. Problems include narrow roadway, poor visibility, downed trees on roadway.	Not aware of a specific area where wildlife strike occur.	Majority of accidents not reported. Locals respond with assistance.	Alcohol related accidents are not a major problem.	Narrow roadway and poor road bed makes it hard for commercial trucks. Make the road so people can pass safely.
Forest Service Road Maint.	Monthly	Never witnessed an accident but has seen evidences of crashes.	RP 11. Has heard of several accidents and fatalities*.	Winter travel is problematic. Snow packed roads, freezing rain, narrow roadway. Increased traffic on Pipe Creek is making travel more risky.	Aware that wildlife strikes happen but not familiar with how often or location.	Not aware of frequency of non reported accidents.	No first hand knowledge or experience but he can imagine that alcohol has some factor in many of the accidents.	Clean trees away from roadway. Widening is needed for better snow removal.

* There have been no reported fatalities. These are undocumented personal accounts.

4.0 Environmental Conditions

4.1 Environmental Setting

This study corridor is located on a section of Hwy 567 that is heavily forested. Pipe Creek runs adjacent to the roadway through part of the study limits. This area is known for its wildlife habitat and natural beauty. To better understand the biological resources within the corridor a preliminary biological resources investigation was performed. In addition to biological resources, analysis was done of existing socio-economic data and included in the investigation report. The following sections summarize the environmental conditions of the corridor.

4.2 Demographics

According to the U.S. Census and Montana Department of Commerce in 1970 Lincoln County had a population of 18,000 residents. In 2005 Lincoln County population had grown to 19,193 residents. In 2030 the population of Lincoln County is projected to reach 22,850. In 1980 in Lincoln County there were 7,018 households. By 2004 approximately 9,300 households were located in Lincoln County. The number of households in Lincoln County in 2030 is projected to be approximately 10,000. [4] [5] According to the Montana Bureau of Economic Analysis,[6] Lincoln County had 7,539 jobs in 1969 and in 2004 the number of jobs had risen to 8,908. In 2030 the number of jobs in Lincoln County is projected to be approximately 10,000 jobs. The average income per household in Lincoln County in 2030 is projected to be $62,195.

Exhibits A-C – Demographics

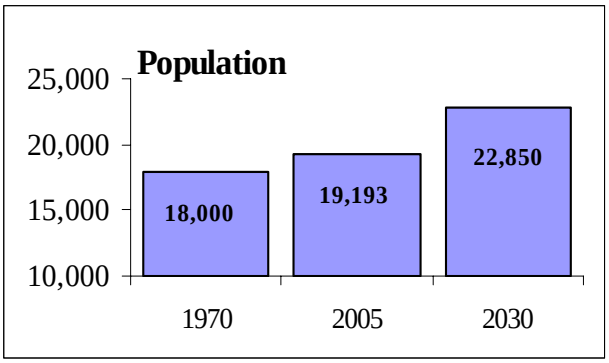

Exhibit A: Lincoln County Population

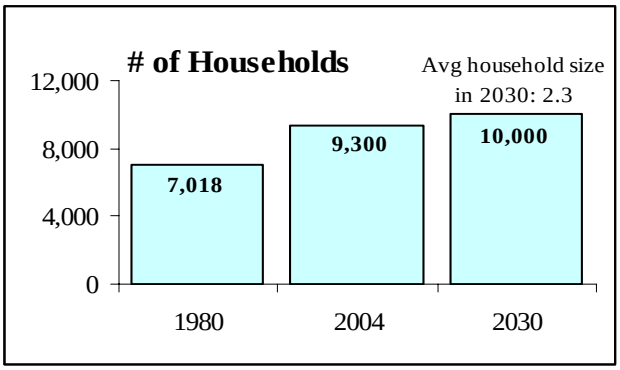

Exhibit B: Number of Households in Lincoln County

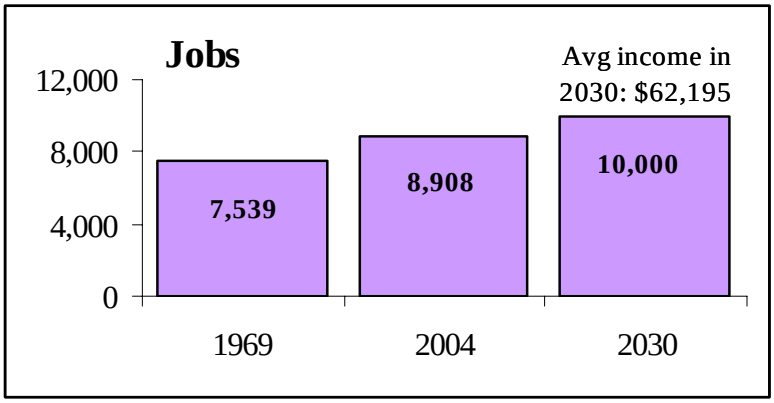

Exhibit C: Lincoln County Employment

[4] US Census Bureau, http://factfinder.census.gov/home/saff/main.html?_lang=en
[5] State of Montana, Department of Commerce, http://www.ceic.mt.gov
[6] http://www.bber.umt.edu/content/?x=1069